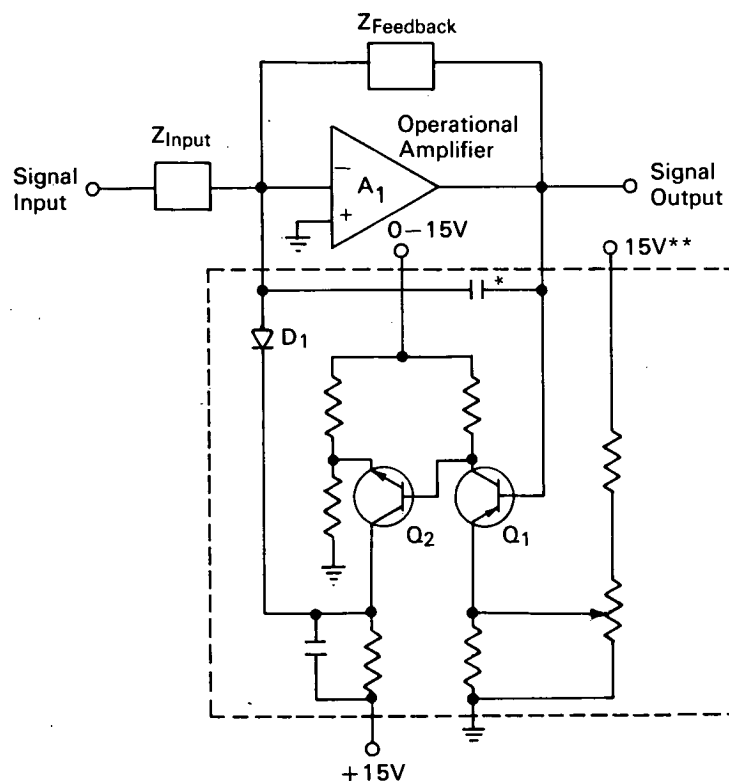


AEC-NASA TECH BRIEF



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Limit Circuit Prevents Overdriving of Operational Amplifier



* Size Depends on Amplifier and $Z_{Feedback}$ (Capacitor May Not be Needed)

** Polarity Is Dependent on Signal Output Being + or - Relative to Ground Reference

The problem:

To design a circuit for use with an operational amplifier that limits the output from exceeding a desired value. A standard 15-volt powered transistorized operational amplifier will usually hold the output to within 0.3 to 0.5 volt of a desired limit by means of a simple diode clamp even though the input is being overdriven. It was required to have an operational amplifier having a hard limit, e.g., one whose output is clamped to within 0.002 volt of a desired set limit.

The solution:

A cutoff-type high gain amplifier coupled by a diode around the operational amplifier.

How it's done:

The gain of the feedback circuit (as shown) is high, and whenever the output of the amplifier reaches a preset limit, any excess is amplified and fed back to the input side of the amplifier. The amplified feedback signal offsets the excess input signal that tends to cause the amplifier to exceed its preset limit. The output is, therefore, held to the set clamp level.

(continued overleaf)

Notes:

1. The circuit limits output to less than 2 mv for a 14-volt overdrive on the input.
2. The illustration shows a negative going signal output clamp. For a positive going signal output clamp, Q_1 and Q_2 should be interchanged and the diode polarity D_1 reversed.
3. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
AEC-NASA Space Nuclear Propulsion
Office
U.S. Atomic Energy Commission
Washington, D.C. 20545
Reference: B67-10343

Patent status:

No patent action is contemplated by NASA or AEC.

Source: F. L. Openshaw
of Aerojet-General Corp.
under contract to
AEC-NASA Space Nuclear Propulsion Office
(NUC-10082)